Influence of cement composition on the corrosion of reinforcement and sulfate resistance of concrete

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ACI Materials Journal
Vol. 87, Issue.2, 1990

Abstract: Performance data based on accelerated corrosion-monitoring and exposure site tests indicate that cement type, reflecting particularly the C3A content, significantly affected concrete durability with respect to corrosion of reinforcing steel. On average, Type I cement (C3A = 9.5 percent) performed 1.7 times better than Type V cement (C3A = 2.8 percent) in terms of time of initiation of corrosion. Accelerated sulfate-resistance tests show that a 20 percent microsilica blended with Type I 14 percent C3A cement performed 1.4 times better against sulfate attack than a Type V portland cement with 1.88 percent C3A. Also, sulfate deterioration data indicate that, in addition to the C3A content, the C3S/C2S ratio of the cement has a significant effect on the sulfate resistance of the cement. Additional study results are discussed.